**🧠 Puzzle 1: 3 Switches and 3 Bulbs**

**Problem:**  
You are outside a room with 3 switches. Inside the room are 3 bulbs. You can only enter the room once. How can you find out which switch controls which bulb?

**Solution:**

1. Turn on **Switch 1**, leave it on for 5 minutes.
2. Turn **Switch 1 off**, then turn on **Switch 2**.
3. Enter the room:
   * The bulb that is **on** → Switch 2.
   * The bulb that is **off but warm** → Switch 1.
   * The bulb that is **off and cold** → Switch 3.

**🧠 Puzzle 2: Heavier Ball (Weighing Puzzle)**

**Problem:**  
You have 8 balls. One is heavier, and the rest are equal in weight. You have a balance scale. What is the **minimum number of weighings** needed to find the heavier ball?

**Solution:**

* Divide into 3 groups: 3, 3, 2.
* First weighing: compare 3 vs 3.
  + If equal → heavy ball is in group of 2 → 1 more weighing.
  + If not equal → heavy group → divide further → 1 more weighing.

✅ **Answer: 2 weighings.**

**🧠 Puzzle 3: A Man and the Lift**

**Problem:**  
A man lives on the 10th floor. He takes the elevator down to the ground floor every day. But when he returns, he takes the lift only to the 7th floor and walks the rest — unless it's raining. Why?

**Solution:**  
The man is **short**. He can only reach the button for the 7th floor. When it rains, he uses his umbrella to press the 10th floor button.

**🧠 Puzzle 4: Frog in a Well**

**Problem:**  
A frog is at the bottom of a 30-foot well. It climbs 3 feet each day but slips down 2 feet at night. How many days will it take to reach the top?

**Solution:**

* Net gain per day = 1 foot (3 - 2).
* After 27 days, the frog reaches 27 feet.
* On day 28, it climbs to 30 feet **and doesn't slip**.

✅ **Answer: 28 days.**

**🧠 Puzzle 5: Two Egg Problem (Optimization Puzzle)**

**Problem:**  
You have 2 eggs and a 100-floor building. Find the **highest floor** from which you can drop an egg without breaking it — in the **minimum number of drops**.

**Answer:**  
Use a strategy that minimizes the worst-case number of drops:

* Drop first egg at floors: 14, 27, 39, 50... decreasing by 1 step.
* This ensures max 14 drops.

✅ **Minimum number of trials in worst case: 14.**

**🧠 Puzzle 6: 5 Pirates and 100 Gold Coins**

**Problem:**  
5 pirates (A to E) need to divide 100 coins. The most senior pirate proposes a distribution. If 50% or more agree, it's accepted. Otherwise, he is thrown overboard. What should the senior pirate propose?

**Logic:**

* Pirates are smart and selfish.
* Pirate A must keep enough pirates alive and happy to avoid being overthrown.

✅ **Answer:**  
Pirate A gives:

* 98 coins to himself,
* 1 coin to C and 1 to E (so they vote in favor — they get more than they would if A dies).

**🧩 Puzzle 1: Poison Bottle Puzzle**

**Problem:**  
You have **1000 bottles**, one of which contains poison. You have **10 lab rats** and a poison that kills in **24 hours**.  
How can you find the poisonous bottle in **one day**?

**✅ Solution:**

This is a **binary logic puzzle**.

* Number each bottle from **1 to 1000**.
* Convert each number to **10-bit binary** (because 2¹⁰ = 1024).
* Assign each **bit** to a **rat**.

Example:  
Bottle 5 → Binary: 0000000101  
So: Rat 1 and Rat 3 drink from bottle 5.

* Each rat drinks from all bottles where their bit is 1.
* After 24 hours, check which rats died.

If Rat 1 and Rat 3 died → binary 0000000101 → bottle **5** is poisonous.

✅ You can uniquely identify the bottle using **binary encoding**!

**🧩 Puzzle 2: The Hourglass Puzzle**

**Problem:**  
You have a **7-minute** and an **11-minute** hourglass.  
How do you measure **15 minutes**?

**✅ Solution:**

1. Start both hourglasses at the same time.
2. When **7-minute** runs out → flip it (7 minutes passed).
3. When it runs out again (14 minutes total) → flip the **7-minute** again.
4. Let it run for **1 more minute**.

✅ Total time = 14 + 1 = **15 minutes**

**🧩 Puzzle 3: The Bridge and Torch Puzzle**

**Problem:**  
4 people need to cross a bridge at night. They have **one torch** and the bridge can hold **2 people at a time**.

Their crossing times:

* Person A = 1 min
* Person B = 2 min
* Person C = 5 min
* Person D = 10 min

Whenever two people cross, they walk at the **slower person’s pace**.  
What’s the **minimum time** for all to cross?

**✅ Solution:**

Let’s use a strategy that **minimizes the slow trips**.

1. A and B cross → 2 mins (A + B)
2. A returns → 1 min
3. C and D cross → 10 mins
4. B returns → 2 mins
5. A and B cross again → 2 mins

Total = 2 + 1 + 10 + 2 + 2 = **17 minutes**

✅ Optimal time: **17 minutes**